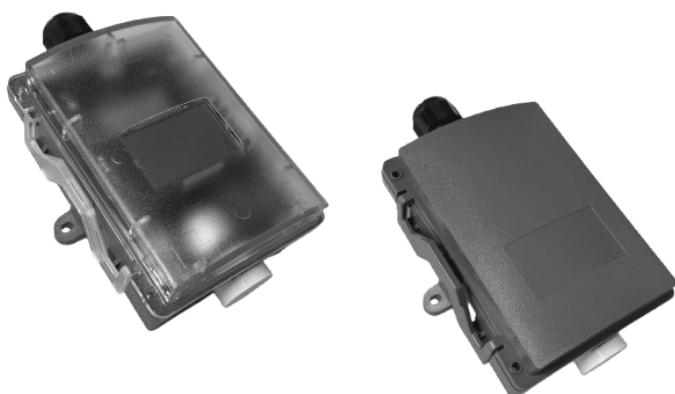




Features and Benefits

- 4-20mA or 0-10Vdc output, optional Modbus
- Replaceable electro-chemical cell, operating life up to 6 years
- Selectable ranges CO ranges
- Selectable response times
- Optional relays, buzzer and LCD

Technical Overview

Using latest electro-chemical sensor technology with high repeatability and sensitivity to Carbon Monoxide gases in the ambient air, this sensor ensures accurate and maintenance free operation. The sensor modules have a catalytic ability to ensure years of operation with no chance of sensor life degradation as known from other electro-chemical sensors.

IMPORTANT The sensor is not designed, manufactured or intended for use or re-sale as control or monitoring equipment in environments requiring life safety performance, in which the failure of the sensor could lead directly to death, personal injury, or severe physical or environmental damage. Sontay and its suppliers specifically disclaim any express or implied warranty of fitness for life safety.

Product Codes

GS-CO-P Wall mounted Carbon Monoxide Sensor 0-10Vdc or 4-20mA Output, Multi Range Selectable:
0 to 100ppm, 300ppm, 500ppm & 1000ppm

Suffixes (add to part code)

-M Modbus
-LCD LCD display
-R1 Relay x 1
-R2 Relay x 2
-B Buzzer

Specification

Power supply	24Vac $\pm$ 5% or 15 to 35Vdc
Consumption	<2.5W
Outputs:	
AO1	4-20mA, 500 Ω max.
AO2	0-10Vdc, 1000 Ω max.
Modbus	RTU (optional)
Relay	24Vac @ 1A
Electrical connections	1.5mm ² max.
Output ranges:	
0 to 100ppm	
0 to 300ppm	
0 to 500ppm	
0 to 1000ppm	
Accuracy	$\pm$ 3% full scale
Sensor:	
T90	<50 seconds
Life	>6 years expected
Drift	<5% per year
Resolution	1ppm
Repeatability	< $\pm$ 2%
Base line	<5ppm
Coverage	762 to 2286m ² typical
Environmental:	
Housing	-20 to 50°C
Pressure	15 to 90% RH non-condensing
Housing:	800 to 1200mbar
Material	PC/GF (Halogen free, flame retardant & UV stabilized)
Dimensions	123 x 103 x 54mm
Protection	IP65
Country of origin	UK
Conformity	EMC, CE & UKCA Marked

WEEE Directive:



At the end of the products useful life please dispose as per the local regulations. Do not dispose of with normal household waste. Do not burn.



Cross Sensitivity

1. The values given are only for information and should not be used as a basis for cross calibration.
2. Cross sensitivities may not be linear and should not be scaled either.
3. Data based on gassing for 5 minutes using test equipment.

Test Gas	Concentration	CO Equivalent
Carbon Monoxide	100ppm	100ppm
Hydrogen Sulphide	50ppm	0ppm
Sulphur Dioxide	20ppm	0ppm
Hydrogen	100ppm	<35ppm
Nitric Oxide	50ppm	<10ppm
Ethanol	200ppm	<1ppm
Ammonia	50ppm	0ppm
Chlorine	15ppm	<1ppm
Ethylene	100ppm	96ppm

General Notes

1. High density of some other gasses may effect the measurements.
2. If cable runs parallel to the mains cable: Use shielded cables.
3. Test only with certified calibration gasses.
4. The data indicated under "Specification" applies only to vertically mounted transmitters.
5. Wall/Room type transmitters should have to be mounted in the centre of wall but not near to any doors and windows.

Installation



Antistatic precautions must be observed when handling these sensors. The PCB contains circuitry that can be damaged by static discharge.

Note: Not to be used in domestic applications

1. Select a location where construction dust & contaminants are at a minimum and which will give a representative sample of the prevailing air condition.
2. Fix the housing to the wall with appropriate screws, with the gas sensor cell pointing downwards. Release the snap-fit lid by gently squeezing the locking tab and feed the cable through the M20 waterproof gland and terminate the cores at the terminal block. Leaving some slack inside the unit, tighten the cable gland onto the cable to ensure water tightness.

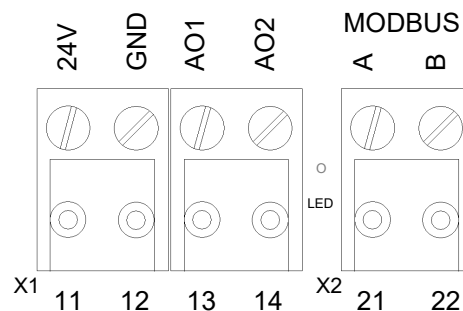
X1 Terminal

11	24V	15 to 35Vdc or 22.8 to 25.2Vac @ 50/60Hz
12	GND	Common 0V
13	AO1	Analogue output, 4-20mA
14	AO2	Analogue output, 0-10Vdc

X2 Terminal

22	A	Modbus RS485 (optional)
23	B	Modbus RS485 (optional)

LED Periodically blink on/off
Modbus communication, blinks when connected



Notes: Relay output connections on following page

Modbus:

- Use shielded and twisted paired cable
- Observe RS485 connections, max. 32 devices in signal Modbus line

Installation (continued)

4. Set the dip switches on the PCB for the required measurement range and response time.

DIP	Range	DIP	Response
	100ppm		1 second
	300ppm		5 seconds
	500ppm		30 seconds
	1000ppm		60 seconds

5. Optional relay connections are via RL1 and RL2

X3 Terminal

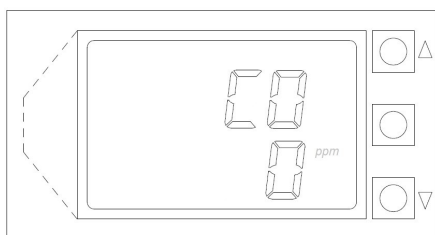
31	Relay 1	Common
32	Relay 1	Normally open
33	Relay 2	Common
34	Relay 2	Normally open

6. Apply power to the sensor and the LED will periodically blink on/off then snap shut the lid.
7. Allow 5 minutes before checking functionality, and at least 30 minutes before carrying out pre-commissioning checks. This will allow the CO sensor to fully warm up.

Sensor Coverage

The coverage offered by the sensor typically varies between 762m² & 2286m² but entirely depends on the characteristics of the individual installation. The coverage can only be confirmed by testing the system once installed.

Display & Button Functions



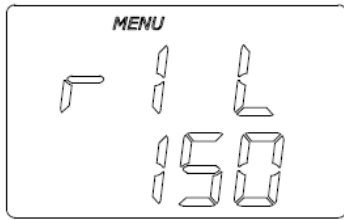
UP Press for increasing the value or choosing the next parameter.

MENU Press and wait to enter MENU (countdown 3 to 0 then release),
Click to navigate between sub menus one by one.

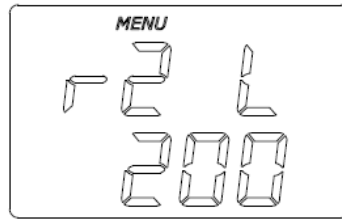
DOWN Press for decreasing the value or choosing the previous parameter.

Parameters for Relay & Buzzer

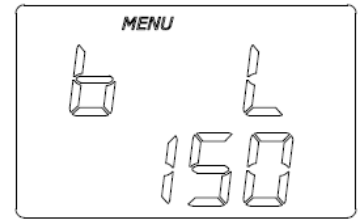
Main screen >>>>> r1 L > r1 H > r1 A > r2 L > r2 H > r2 A . B L > B H > B A > Main screen



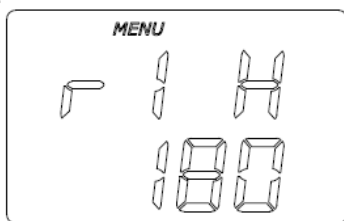
LOW setpoint for Relay 1



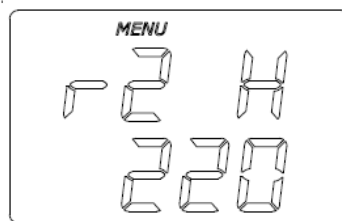
LOW setpoint for Relay 2



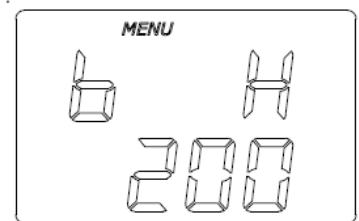
LOW setpoint for Buzzer



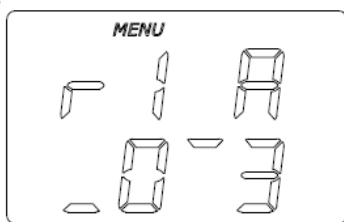
HIGH setpoint for Relay 1



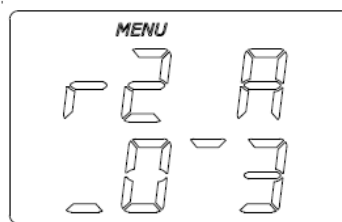
HIGH setpoint for Relay 2



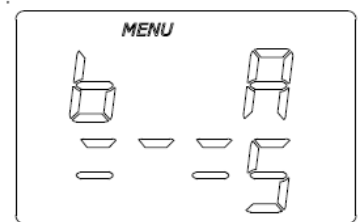
HIGH setpoint for Buzzer



ACTION selection for Relay 1



ACTION selection for Relay 2

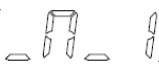


ACTION selection for Buzzer

Actions For Relay & Buzzer



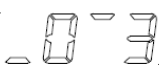
action 0, valid for relays and buzzer,
relay contact is always OPEN,
buzzer is always SILENCE.



action 1, valid for relays and buzzer,
relay contact is CLOSED between points, OPEN under LOWpoint and OPEN over HIGHpoint,
buzzer is WARNING between points, SILENCE under LOWpoint and SILENCE over HIGHpoint.



action 2, valid for relays and buzzer,
relay contact is OPEN between points, CLOSED under LOWpoint and OPEN over HIGHpoint,
buzzer is SILENCE between points, WARNING under LOWpoint and SILENCE over HIGHpoint.



action 3, valid for relays and buzzer,
relay contact is CLOSED over HIGHpoint, OPEN under LOWpoint, hysteresis between points,
buzzer is WARNING over HIGHpoint, SILENCE under LOWpoint, hysteresis between points.



action 4, valid for relays and buzzer,
relay contact is OPEN over HIGHpoint, CLOSED under LOWpoint, hysteresis between points,
buzzer is SILENCE over HIGHpoint, WARNING under LOWpoint, hysteresis between points.

Actions For Relay & Buzzer (continued)



action 5, valid only for buzzer,
buzzer is WARNING over HIGHpoint, SILENCE under LOWpoint,
buzzer is WARNING intermittently between points.



action 6, valid only for buzzer,
buzzer is WARNING under LOWpoint, SILENCE over HIGHpoint,
buzzer is WARNING intermittently between points.



action 7, valid only for buzzer,
buzzer is following relay 1 contact,
buzzer is WARNING when relay 1 contact is CLOSED, SILENCE when the contact is OPEN.



action 8, valid only for buzzer,
buzzer is following relay 2 contact,
buzzer is WARNING when relay 2 contact is CLOSED, SILENCE when the contact is OPEN.

Actions	Under LOW	Between LOW & HIGH	Over HIGH
0 : 0.0.0	Open / Silence	Open / Silence	Open / Silence
1 : 0.1.0	Open / Silence	Closed / Warning	Open / Silence
2 : 1.0.1	Closed / Warning	Open / Silence	Closed / Warning
3 : 0.X.1	Open / Silence	Hysteresis	Closed / Warning
4 : 1.X.0	Closed / Warning	Hysteresis	Open / Silence
5 : 0.-.1	Silence	Pre Alarm	Warning
6 : 1.-.0	Warning	Pre Alarm	Silence
7 : = r1	Silence when RL1 is Open, Warning when RL1 is Closed		
8 : = r2	Silence when RL2 is Open, Warning when RL2 is Closed		

- 0 : Relay Contact is OPEN, Buzzer is in Silent mode
- 1 : Relay Contact is CLOSED, Buzzer is in Warning mode
- X : Relay Contact is at HYSTERESIS position, OPEN if previous position open, CLOSED if previous position closed
- : Buzzer is in HYSTERESIS mode, Silent if previous mode is silent, Warning if previous mode is warning
- : Buzzer is in PRE ALARM mode, Buzzer is warning intermittently

Modbus

Default Settings:

Address: 1
Baud rate: 9600
Data Bits: 8
Parity: None
Stop Bits: 1

Register Table starts from Base 1

Use Function 3 for Reading and Function 6 for Writing Holding Registers. Whenever writing to any Modbus Parameter, new parameter is activated instantly and you should have to configure master device according to new parameters. For every reboot/initializing Modbus is activated with default parameters for 3 seconds. After 3 seconds, Modbus is reconfigured according to your parameter settings.

Unlisted registers are for analog output calibrations and some system parameters. Please do not change unlisted registers.

ID 254 is the general address. The transmitter replies to address 254 regardless of its own ID. Please use one master and one slave for checking the Modbus address. Also, baudrate and other parameters should match.

Modbus Registers

Register	R / W	Range	Description
1	R & W	1...254	Modbus Address
2	R & W	0...4	Baudrate, 0: 9.600, 1: 19.200
3	R & W	0...3	Bit_Parity_Stop, 0: 8bit_None_1, 1: 8bit_None_2, 2: 8bit_Even_1, 3: 8bit_Odd_1
4	R	0...1.000	CO level as ppm
5	R	0...10.000	CO level as ppm x10, divide by 10 for exact value
6	R	0 or 1	Relay 1, contact position, 0: OFF - Contact is Open, 1: ON - Contact is Closed
7	R	0...1.000	Relay 1, LOW point
8	R	0...1.000	Relay 1, HIGH point
9	R	0...4	Relay 1, ACTION
10	R	0 or 1	Relay 2, contact position, 0: OFF - Contact is Open, 1: ON - Contact is Closed
11	R	0...1.000	Relay 2, LOW point
12	R	0...1.000	Relay 2, HIGH point
13	R	0...4	Relay 2, ACTION
14	R	0 or 1	Buzzer, 0: OK-Silence, 1: PreAlarm - warning intermittently, 2: WARNING continuously
15	R	0...1.000	Buzzer, LOW point
16	R	0...1.000	Buzzer, HIGH point
17	R	0...4	Buzzer, ACTION
39	R & W	0...60	RESPONSE, 0: DIP Switch Active, 1-60: DIP Switch Passive & Response time in seconds
40	R & W	0...4	SPAN, 0: DIP Switch Active, 1-4: DIP Switch Passive, 1:100, 2:300, 3:500, 4:1000 PPM
42	R		CO instant value, last measurement
43	R		CO level as ppm
44	R		CO level as ppm x10, divide by 10 for exact value
45	R		ZERO trimmer value
46	R		SPAN trimmer value

Calibration - General Information

Sensors are fully calibrated before dispatched, re-calibration should not be necessary. Annual calibration checks, or carried out at a frequency determined through risk assessment, should take place. If the device is found to be out of tolerance, the following method can be followed.

Before the process;

1. Please keep the unit working for minimum 10 minutes at fresh air for settling the baseline.
2. Please use certified calibration CO Test Gasses.
3. Please use a precision multimeter,
 - ⊖ is showing Negative/Reference Point,
 - ⊕ is showing Positive Measurement Point.
4. Set the best range according to calibration gas.
5. Single point calibration is enough for any range.
6. Calibration steps: Check the typical values, Set ZERO, Set SPAN.

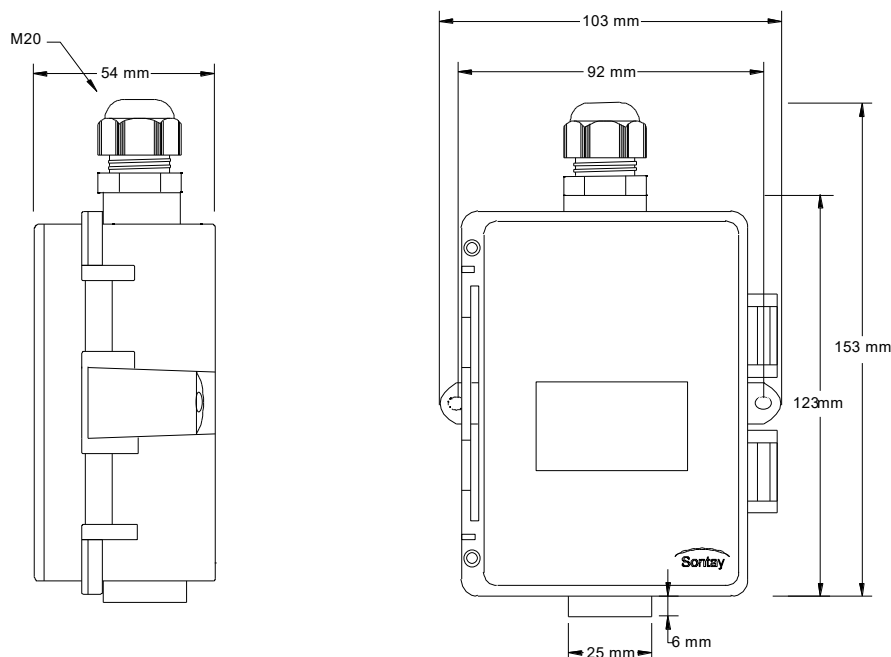
ZERO Calibration

1. Use ZERO Trimmer for setting ZERO value.
2. Read the data at HR45 (Modbus Holding Register 45).
3. Set the ZERO trimmer 1-2 steps over HR45.
4. Check the 0ppm value as 0V or 4mA from outputs or from LCD or from Modbus.

SPAN Calibration

1. Use SPAN Trimmer for calibration.
2. Before applying the Test Gas, please be sure about the ZERO (0ppm) measurement.
3. Apply the test gas for min. 1 minute with 0.5 lt/min. flow rate.
4. Start calibration with SPAN trimmer.
5. Check and confirm the calibration gas concentration value from outputs or from LCD or from Modbus.
6. Applying test gas for 3 minutes is enough for a standard calibration.
7. For best calibration, you can apply the test gas for 5 minutes.
8. Applying the test gas for longer and for many times, reduces the CO Sensing Element life.

Dimensions



Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense resulting from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.